CR10X INSTRUCTIONS AND PARAMETERS

INPUT/OUTPUT INSTRUCTIONS

INST.		01:	02:	03:	04:	05:	06:	07:	08:	09:	10:	11:	12:	13:	14:
1	VOLT (SE)	REPS	RANGE†	SE CHAN	LOC	MULT	OFFSET								
2	VOLT (DIFF)	REPS	RANGE†	DIFF CHAN	LOC	MULT	OFFSET								
3	PULSE	REPS	CHAN/PORT	CONFIG†	LOC	MULT	OFFSET								
4	EX-DEL-SE	REPS	RANGE†	SE CHAN	EX CHAN†	DELAY 0.01 s	EXCIT mV	LOC	MULT	OFFSET					
5	AC HALF BR	REPS	RANGE†	SE CHAN	EX CHAN†	EXCIT mV	LOC	MULT	OFFSET						
6	FULL BR	REPS	RANGE†	DIFF CHAN	EX CHAN†	EXCIT mV	LOC	MULT	OFFSET						
7	3W HALF BR	REPS	RANGE†	SE CHAN	EX CHAN†	EXCIT mV	LOC	MULT	OFFSET						
8	EX-DEL-DIFF	REPS	RANGE†	DIFF CHAN	EX CHAN†	DELAY 0.01 s	EXCIT mV	LOC	MULT	OFFSET					
9	FULL BR w/M EX	REPS	EX RANGE†	BR RANGE†	DIFF CHAN	EX CHAN†	EXCIT mV	LOC	MULT	OFFSET					
10	BATT VOLT	LOC													
11	TEMP (107)	REPS	SE CHAN	EX CHAN†	LOC	MULT	OFFSET								
12	RH (207)	REPS	SE CHAN	EX CHAN†	TEMP LOC	RH LOC	MULT	OFFSET							
13	TC TEMP (SE)	REPS	RANGE†	CHAN/LOC†	TC TYPE†	REF LOC	LOC	MULT	OFFSET						
14	TC TEMP (DIFF)	REPS	RANGE†	CHAN/LOC†	TC TYPE†	REF LOC	LOC	MULT	OFFSET						
15	PORT SERIAL I/O	REPS	CONFIG†	CTS/DELAY	PORT	OUT LOC	NO. LOC	T CHAR	MAX	IN DELAY	LOC	MULT	OFFSET		
16	RTD TEMP	REPS	R/Ro LOC	LOC	MULT	OFFSET									
17	INTERNAL TEMP	LOC													
18	TIME	OPTION†	MOD/BY	LOC											
19	SIGNATURE	LOC													
20	PORT SET	8765†	4321†												
21	PORT w/DURATION	PORT	LOC DELAY 0.01 s												
22	EXCIT w/DEL	EX CHAN†	DEL w/ex.	DEL after ex.	EXCIT mV†										
23	BURST MODE	NO. CHAN	RANGE†	IN CHAN	OPTION†	SCAN (ms)	SCANS (10^3)	SMPLS	TR LIM mV	EXCIT mV	LOC	MULT	OFFSET		
24	CALIBRATION	LOC†													
25	READ PORTS	MASK†	LOC												
26	TIMER	LOC (0 resets timer)													
27	PERIOD AVG (SE)	REPS	OPTION†	SE CHAN	NO CYC	LIM 0.01 s	LOC	MULT	OFFSET						
28	VIB WIRE (SE)	REPS†	SE CHAN	EX CHAN	START F†	END F†	NO CYC	DEL 0.01 s	LOC	MULT	OFFSET				
29	PS9104E	DIFF CHAN	EX CHAN	LOC	Enhanced Parameters (CSI parameters 4-23)†										
100	TDR 1502B	See manual													
101	SDM-INT8	ADDR	C:8765†	C:4321†	F:8765†	F:4321†	AVG OPT†	LOC	MULT	OFFSET					
102	SDM-SW8A	REPS	ADDR	FUNCT†	CHAN	LOC	MULT	OFFSET							
103	SDM-AO4	REPS	ADDR	LOC											
104	SDM-CD16AC	REPS	ADDR	LOC											
105	SDI-12 RECORDER	ADDR	CMD†	PORT	LOC	MULT	OFFSET								
106	SDI-12 SENSOR	ADDR	TIME/VAL†	LOC											
107	SDM CSAT3	REPS	ADDR	OPTION†	LOC										
108	SDM UDG01	ADDR	TEMP LOC	LOC	MULT	OFFSET									
109	SDMX50	ADDR	CHAN												
110	SDM GROUP TRIGGER														
113	SDM-SIO4	REPS	ADDR	MODE	COMMAND	1^{ST}PAR	2^{ND}PAR	VALUES/REP	LOC	MULT	OFFSET				
114	SET TIME	OPTION†	LOC												
115	SDM BAUD	BIT PERIOD 10 µs													
117	DATALOGGER ID	LOC													
118	SDM CAN	ADDR	T.QUANTA	TSEG1	TSEG2	ID 0-10	ID 11-23	ID 24-28	DATA TYPES	START BIT	NO. BITS	NO. VALUES	LOC	MULT	OFFSET
119	TDR100	ADDR	OUTPUT†	MUX/PROBE†	WAVFRM AV	Vp	POINTS	C. LENGTH	W.LENGTH	P.LENGTH	P.OFFSET	LOC	MULT	OFFSET	
130	STATUS MONITOR	OPTION†	LOC												
131	EXTENDED VIB WIRE	REPS	RANGE†	SE CHAN	EX CHAN	START F	END F	SWEEP	NO. STEPS	D MEAS	CYCLES	D REPS	LOC	MULT	OFFSET
138	CS616 WATER CONTENT	REPS	SE CHAN	PORT†	LOC	MULT	OFFSET								
188	SDM-IO16	ADDR	COMMAND	1^{ST} PAR†	2^{ND} PAR†	3^{RD} PAR†	4^{TH} PAR†	C.LOC	LOC	MULT	OFFSET				

† Option Codes

1-14 *RANGE codes:*

Slow (2.72 ms integration time)
Fast (250 µs integration time)
60 Hz rejection
50 Hz rejection
Full scale range

0	10	20	30		Autorange
1	11	21	31	±	2.5 mV
2	12	22	32	±	7.5 mV
3	13	23	33	±	25 mV
4	14	24	34	±	250 mV
5	15	25	35	±	2500 mV

3 *CONFIGuration codes:*

To record all counts:

0 High frequency (-- 64 Hz reset)
1 Low level AC (-- 64 Hz reset)
2 Switch Closure
3 High frequency, 16-bit
4 Low level AC, 16-bit
4 Low level AC, 16-bit
Discard counts beyond execution Interval
1x (x = 0-4 from above)
Discard counts, output frequency (Hz)
2x (x = 0-4 from above)

4-10,12 *EXcitation CHANnel codes:*

0x Excite all reps with EX CHAN x
1x Increment EX CHAN x with each rep

11 *EXcitation CHANnel codes:*

0x Excite all reps with channel x
1x Increment chan x with each rep
2x Excite all reps with channel x, 60 Hz rej
3x Excite all reps with channel x, 50 Hz rej
4x Increment chan x with each rep, 60 Hz rej
5x Increment chan x with each rep, 50 Hz rej

13,14 *CHANnel/LOCation:*

If channel is indexed, parameter 3 becomes an input location holding a voltage measurement.

13, 14 *ThermoCouple TYPE codes:*

x1 T (copper-constantan)
x2 E (chromel-constantan)
x3 K (chromel-alumel)
x4 J (iron-constantan)
x5 B (platinum-rhodium)
x6 R (platinum-rhodium)
x7 S (platinum-rhodium)
x8 N (nickel-chromium)
x = 0 Normal Measurement
x = 8 TC input from A5B40 isolation
x = 9 Output -99999 if out of common mode range (Inst. 14 only)

15 *Configuration codes:*

ASCII	Hex Pair	Binary	Logic level/Baud
00	10	20	TTL, 1200 baud
01	11	21	RS-232, 1200 baud
02	12	22	TTL, 300 baud
03	13	23	RS-232, 300 baud

18 *OPTION codes:*

0 seconds into minute (max 60)
1 minutes into day (max 1440)
2 hours into year (max 8784)
3 store year, day, hour, minute, second into 5 input locations

20 *8765, 4321 Each digit configures respective port*

0 Set low
1 Set high
2 Toggle
3 1 ms Pulse
4 10 ms Pulse
5 100 ms Pulse
6 1 s Pulse
} Sets duration for subsequent Pulse Port Command.
7 Configure as output
8 Configure as input
9 No change

22 *EXcitation CHANnel/EXCITation mV:*

If excitation channel is indexed, parameter 4 becomes the input location from which to get the excitation voltage.

23 *RANGE codes:*

Fast (250 µs integration time)
Full scale range

13	±	25 mV
14	±	250 mV
15	±	2500 mV

23 *OPTION code, 4 digits:*

ABCD
A Trigger
0 Trigger on 1st analog channel
1 Digital trigger on C1
2 Same as 0, but sets C1 high during measurements
B Trigger option
0 Trigger immediately
1 Trigger if above limit (high)
2 Trigger if below limit (low)
3 Trigger on rising edge
4 Trigger on falling edge
C Destination
0 Input Storage
1 Serial port, 9600 baud
2 Serial port, 76800 baud
3 Serial port, 76800 baud to Storage Module
D Measurement
0 Differential measurement
1 Single-ended measurement

24 *LOCation (start of 19 calibration values)*

xxxx Calibrate only when 24 is executed
xxxx-- (key in C before entering) store results of automatic calibration

25 *MASK:*

Base 2 representation of ports 8-1; 1 means read, 0 means don't read. Entered as base 10 (0-255). Results are stored as base 2 converted to base 10. 1 indicates high, 0 indicates low or not read.

27 *OPTION codes:*

Code	Peak-to-Peak Volts	Max. Freq.
x1	2.0 mV	8 kHz
x2	3.0 mV	20 kHz
x3	12 mV	50 kHz
x4	2.0 V	200 kHz

x = 0 Output period in microseconds
x = 1 Output frequency in kHz

28 *REPS: Hit C (--) to skip repeat of excit.*
START Frequency of sweep (100s of Hz)
END Frequency of sweep (100s of Hz)

29 *Enhanced Parameters*

These parameters are listed on the manufacturer's calibration sheet, where:

CSI Par.	Enhanced Par.
04-23:	1-20

101 *C:8765, C:4321 Each digit Configures respective channel*

0 High level, rising edge
1 High level, falling edge
2 Low level ac, rising edge
3 Low level ac, falling edge

101 *F:8765, F:4321 Each digit sets Function for respective channel*

0 No value returned
1 Period, ms
2 Frequency, kHz
3 Time since previous channel, ms
4 Time since channel 1, ms
5 Counts on 2 since 1, interpolated
6 Low resolution frequency, kHz
7 Counts
8 Integral counts on 2 since 1

101 *AVeraGing OPTion*

0 Execution interval averaging
0-- Continuous averaging
xxxx Specify average interval in ms

101 *AVeraGing OPTion (continued)*

xxxx-- Capture all events until xxxx edges of channel 1
9999-- Test Memory

102 *FUNCTion*

0 Channel state
1 Duty cycle
2 Counts
3 Memory test

105 *SDI-12 CoMmanD codes:*

Entry	Command	Description
0	M	Initiate measurement
0--	C	Initiate concurrent measurement
1..9	M1..M9	Additional measurement commands specified by the SDI-12 sensor
10	V	Initiate verify sequence
11	I	Send identification
20..29	R0..R9	Send command to sensor and retrieve data

106 *TIME/VALues codes:*

ttnn: tt = time (seconds)
nn = No. values

107 *OPTION codes:*

0 Get data and measure
1..6,10,12,15,20,30,& 60 Execution Parameter
99 Get data after a group trigger

114 *OPTION codes:*

0 Set time with hr, min, sec values from 3 input locations
1 Set time with day, hr, min, sec values from 4 input locations
2 Set time with yr, day, hr, min, sec from 5 input locations

119 *MUltipleXer and PROBE selection:*

ABCR
A Level 1 multiplexer channel
B Level 2 multiplexer channel
C Level 3 multiplexer channel
R Number of probes to be read, starting with the channel specified by the ABC value
Enter 0 when level is not used.

119 *OUTPUT options*

0 Measure La/L
1 Collect waveform values
2 Collect waveform plus first derivative
3 Measure electrical conductivity

130 *OPTION codes:*

0 Watchdog errors
1 Table overruns
2 Low voltage counts
3 Lithium battery (volts)
4 Flash errors (CR10X-IM and CR10X-2M only)
10 Stores OS version, OS revision, and OS signature in three consecutive locations

131 *RANGE:*

1 8 kHz @ 2 mV peak-to-peak
2 20 kHz @ 3 mV peak-to-peak
3 50 kHz @12 mV peak-to-peak
4 200 kHz @ 2 V peak-to-peak

138 *PORT:*

X Specifies the first control port used. Subsequent repetitions are enabled with the next higher control port.
1X All repetitions are enabled with the specified control port.

188 *1^{ST} PAR, 2^{ND} PAR, 3^{RD} PAR, 4^{TH} PAR:*

1ST PAR configures ports 16-13; 2ND PAR configures ports 12-9; 3RD PAR configures ports 8-5; 4TH PAR configures ports 4-1; each digit configures respective port
0 Ouput logic low
1 Output logic high
2 Input digital, no debounce filter
3 Input switch closure, 3.17 ms debounce filter
4 Input digital interrupt enabled, no debounce filter
5 Input switch closure, interrupt enabled, 3.17 ms debounce filter
9 No change

PROCESSING INSTRUCTIONS

(F is fixed value (constant); X, Y, & Z are input locations)

INST.		01:	02:	03:
30	Z=F*10 EXP	F	EXP	Z
31	Z=X	X	Z	
32	Z=Z+1	Z		
33	Z=X+Y	X	Y	Z
34	Z=X+F	X	F	Z
35	Z=X-Y	X	Y	Z
36	Z=X * Y	X	Y	Z
37	Z=X * F	X	F	Z
38	Z=X/Y	X	Y	Z
39	Z=SQRT(X)	X	Z	
40	Z=LN(X)	X	Z	
41	Z=EXP(X)	X	Z	
42	Z=1/X	X	Z	
43	Z=ABS(X)	X	Z	
44	Z=FRAC(X)	X	Z	
45	Z=INT(X)	X	Z	
46	Z=X MOD F	X	F	Z
47	$Z=X^Y$	X	Y	Z
48	Z=SIN(X)	X	Z	

INST.		01:	02:	03:	04:	05:	06:	07:	08:	09:	10:	11:	12:
49	SPA MAX	SWATH	1ST LOC	MAX LOC†									
50	SPA MIN	SWATH	1ST LOC	MIN LOC†									
51	SPA AVG	SWATH	1ST LOC	AVG LOC									
52	RUNNING AVG	REPS	SOURCE	DEST	# IN AVG								
53	A * X+B	START LOC	A1	B1	A2	B2	A3	B3	A4	B4			
54	BLOCK MOVE	NO VALS	S LOC	S STEP	D LOC	D STEP							
55	POLYNOMIAL	REPS	X	F(X)	C0	C1	C2	C3	C4	C5			
56	SAT VP	TEMP	LOC										
57	WB/DBT to VP	PRESSURE	DB TEMP	WB TEMP	LOC								
58	LP FILTER	REPS	X	F(X)	WGHT F								
59	RF (X/1-X)	REPS	X	MULT (RF)									
60	FFT	LOG_2 (SMPL)	OPTION†	LOG_2 (AVG)	LOC	MULT							
61	INDIR MOVE	SOURCE X	DEST Y										
62	COV/CORR	VALUES	MEANS	VAR	S DEV	COV	CORRS	SAMPLES	S LOC	D LOC			
63	EXT PARA 2-DIGIT	†(8 parameters, depends on the inst. that 63 follows)											
64	PAROSCIENTIFIC	VALUES LOC†	DEST LOC†										
65	BULK LOAD	F	F	F	F	F	F	F	F	LOC			
66	Z=ARCTAN(X/Y)	X	Y	Z									
67	DYNAGAGE	B LOC	KSH	RESIST	AREA	CONDUCT	TC GAP	LF CUTOFF	HF CUTOFF	OUTPUT†	D LOC	MULT	OFFSET
68	EXT PARA 4-DIGIT	†(8 parameters, depends on the inst. that 68 follows)											

† Option Codes

49, 50 *MAX/MIN:*

0xxx Store spatial max or min at loc xxx
1xxx Store max or min at loc xxx & loc of max or min at xxx+1

60 *OPTION codes:*

0x Power spectra
1x Real and imaginary
2x Magnitude and phase
x = 0 No taper
x = 1 Taper

63, 68 *PARAMETERS 1-8:*

Following Inst. 97 RF IDs & Phone No.: 1 digit at a time
32 Between RF IDs (e.g., repeater & site)
32 & 84 Between RF & Phone Modem No.
70 After last RF
13 To end
Following Inst. 98 (256 character limit) Base 10 value of ASCII Character (1-99) 00 To end

64 *VALUES LOC:*

Start Loc: U(t), Tau, U0..T5

64 *DESTination LOCation:*

Start Loc: Temp (°C), pressure (psi), Signature

67 *OUTPUT codes:*

0 Short (sap flow, Kshapp)
1 Long (sap flow, Kshapp, dT, W, Qv, Qr, Qf)

OUTPUT PROCESSING INSTRUCTIONS

Note: A Program Control instruction that sets the output flag high is required to obtain output data from these instructions.

INST.		01:	02:	03:	04:	05:	06:	07:	08:	09:	10:
69	WIND VECTOR	REPS	SMPL/SUBINT†	SEN/OUT†	WS/E	WD/N					
70	SAMPLE	REPS	LOC								
71	AVERAGE	REPS	LOC								
72	TOTALIZE	REPS	LOC								
73	MAXIMUM	REPS	TIME†	LOC							
74	MINIMUM	REPS	TIME†	LOC							
75	HISTOGRAM	REPS	BINS	FORM†	B SEL LOC	WV LOC†	LOW LIM	HIGH LIM			
77	REAL TIME	OPTION†									
78	RESOLUTION	OPTION†									
79	SMPL ON MAX/MIN	REPS	LOC	(must follow Inst. 73 or 74)							
80	STORE AREA	AREA†	LOC/ID								
81	RAIN HISTOGRAM	REPS	S LOC	SWATH	MEAN BINS	AMP BINS	LOW LIM	HIGH LIM	MIN AMP	OPTION†	D LOC†
82	STD DEV	REPS	LOC								

† Option Codes

69 *SaMPLes/SUBINTerval (std dev):*

0 No subinterval
xxxx Number of scans per subinterval

SENsor type/OUTput codes:

x0 Avg WS, Θ1, σ(Θ1)
x1 Avg WS, Θ1
x2 Avg WS, resultant U, Θu; σ(Θu)
x = 0 (anemometers & vanes)
x = 1 (north- & east-facing propellers)
Where: Θ1 = Avg unit vector dir
σ(Θ1) = Std dev dir (Yamartino)
Θu = Avg resultant vector dir
σ(Θu) = Std dev dir (CSI)

73,74 *TIME of max or min:*

00 Max/min value only
01 With seconds
10 With Hour-Minute
11 With Hour-Minute, Second

75 *FORM codes:*

0 Open form (data beyond limits are included)
1 Closed form (data beyond limits are excluded)

WV LOCation:

0 Frequency Distribution
xxxx Weighted Value Loc

77 *OPTION codes:*

xxx1 Seconds
xx1x Hour-Minute
xx2x Hour-Minute, 2400 at midnight
x1xx Day
x2xx Day, Previous day at midnight
1xxx Year
(0 - no output, e.g., 110 = Day, Hr-Min)

78 *OPTION codes:*

0 Low resolution
1 High resolution

80 *AREA codes:*

1 Final Storage 1
2 Final Storage 2
3 Input Storage

81 *OPTION:*

00 Closed form/Fraction output
01 Closed form/Counts output
10 Open form/Fraction output
11 Open form/Counts output

D LOC

0 Send directly to Final Storage
xxxx First input location to store histogram

PROGRAM CONTROL INSTRUCTIONS

(F is fixed data (constant); X, Y, & Z are input locations)

INST.		01:	02:	03:	04:	05:	06:	07:	08:	
83	IF CASE < F	F	CMD†							
85	BEGIN SUBR	SUBR†								
86	DO	CMD†								
87	LOOP	DELAY	COUNT							
88	IF X < = > Y	X	COMP†	Y	CMD†					
89	IF X < = > F	X	COMP†	F	CMD†					
90	LOOP INDEX	STEP								
91	IF FLAG/PORT	COMP†	CMD†							
92	IF TIME	T†	INT†	CMD†						
93	BEGIN CASE	CASE LOC								
94	ELSE									
95	END									
96	SERIAL OUT	DEVICE†								
97	INITIATE TELE	MODEM†	FLAG	LIM(sec)	F DEL(sec)	NO RETRIES	S DEL (min)	FAIL LOC	ID	(must be followed by Inst. 63 or 68)
98	SEND CHAR	DEVICE†	(must be followed by Inst. 63 or 68)							
111	RUN FLASH	F PROGRAM	(indexing compiles program as *6)							
120	TGT1 GOES	See manual								
121	ARGOS	See manual								
125	SDC/ARGOS	See manual								
126	HDR GOES	See manual								
127	HDR GOES STATUS	See manual								

† Option Codes

FLAG DESCRIPTIONS:

0 Output flag
1-8 User flags
9 Intermed. processing disable flag

83-92 ***CoMmanD codes:***

0	Go to end of Pgm. Table
1-9, 79-99	Call Subroutine
10-19	Set flag 0-9 high
20-29	Set flag 0-9 low
30	Then Do
31	Exit Loop if true
32	Exit Loop if false
41-48	Set Port 1-8 high
51-58	Set Port 1-8 low
61-68	Toggle Port 1-8
71-78	Pulse Port 1-8

Ports can be indexed with C (--)

85 ***SUBROUTINE:***

Subroutine number valid entries are 1-9, 79-99; 96, 97 & 98 allow special interrupts on C6, C7 & C8

88,89 ***COMParison codes:***

1 =	3 ≥
2 ≠	4 <

91 ***COMParison codes:***

1x Do if flag x is high
2x Do if flag x is low
4x Do if port x is high
5x Do if port x is low
40 Do if modem is on
50 Do if modem is off
61 Do if ME is active
62 Do if RS-232 is active
65 Do if SDC#5 (RF310M/RF95(A)) is active
66 Do if SDC#6 (COM310) is active
69 Do if SDC#9 is active
71 Do if ME is not active
72 Do if RS-232 is not active
75 Do if SDC#5 (RF310/RF95(A)) is not active
76 Do if SDC#6 (COM310) is not active
79 Do if SDC#9 is not active

Ports can be indexed with C (--)

92 ***Time into INTerval***

xxx T and INT in minutes (T max is 1439, INT max is 1440)
xxx-- T and INT in seconds (T max is 59, INT max is 60)

96,*8 ***DEVICE/baud codes:***

Addressed Print Device

1y Printable ASCII
2y Comma separated ASCII
3y Binary Final Storage format

Serial Printer or Computer

4y Printable ASCII
5y Comma separated ASCII
6y Binary Final Storage format
y = Baud Rate Code

Storage Module

7N Storage Module, address N (1-8)
7N -- Filemark to Storage Module N (1-8)

Transfer Data to Other Final Storage Area

80 New data only (Inst. 96 only)
81 All data (Inst. 96 only)

97 ***MODEM/baud codes:***

0y RF modem
1y Short haul/Direct
2y Phone modem
31 Voice call-back, 1200 baud
40 Voice modem, data call-back, 300 baud
41 Voice modem, data call-back, 1200 baud
5y RF modem (SDC state)

y = Baud Rate Code; baud rate code 3 not valid for Inst. 97.
(97 is followed by Inst. 63 or 68)

98 ***DEVICE/baud codes:***

1y Addressed Print Device
4y Pin-Enabled Print Device
y = Baud Rate Code
(98 is followed by Inst. 63 or 68)

BAUD RATE CODES

y=	0	300
	1	1200
	2	9600
	3	76800

ERROR CODES

3 Program Table full
4 Intermediate Storage full
5 Final Storage Area 2 not allocated
8 CR10X was reset by watch dog timer
9 Insufficient Input Storage
10 Low battery voltage
11 Attempt to allocate unavailable storage
12 Duplicate *4 ID
20 Subroutine encountered before END of previous subroutine
21 END without IF, LOOP, or SUBROUTINE
22 Missing END
23 Non-existent SUBROUTINE
24 ELSE in SUBROUTINE without IF
25 ELSE without IF
26 EXIT LOOP without LOOP
27 IF CASE without BEGIN CASE
30 IFs and/or LOOPS nested too deep
31 SUBROUTINES nested too deep
32 Instruction 3 and interrupt subroutine use same port
33 Cannot use control port 6 as counter with Instruction 15 or SDM
40 Instruction does not exist
41 Incorrect Execution Interval
60 Insufficient Input Storage
61 Burst Measurement Scan Rate too Short
62 N<2 in FFT

***D Mode Errors**

94 Program storage area full
95 Flash program does not exist
96 Addressed device not connected
97 Data not received within 30 seconds
98 Uncorrectable errors detected
99 Wrong file type or editor error

DAY OF YEAR CALENDAR

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JAN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
FEB	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60		
MAR	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
APR	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	
MAY	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151
JUN	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	
JUL	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212
AUG	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243
SEP	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	
OCT	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304
NOV	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	
DEC	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365

Add 1 to unshaded values during leap years.

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CR10X with ARRAY-BASED OS PROMPT SHEET

This prompt sheet is intended for field use or as a reference by those familiar with CR10X programming; additional details and examples are in the CR10X Operator's manual. Computer-assisted programming is supported by EDLOG and Short Cut; communications is supported by LoggerNet or PC208W.

CR10KD Keystrokes

The CR10X can be interrogated or programmed via the 16 keys and display on the CR10KD. The [*] key is the most important because it controls access to each of the CR10X's 14 programming, data storage, and status areas ("star" modes).

Once in a star mode, use [A] & [B] to move between entries. To enter a value, use the [0] through [9] keys, then press [A]. To exit a star mode, key in a different star mode. To exit all star modes and begin logging, key in [*] [0].

General Keystrokes

[0] – [9] Key in data or instructions
[A] Enter (Advance)
[B] Back up
[C] Change value, Index a parameter Change sign of a number
[D] Decimal point
[#] Clear digit just keyed

[*] [0] BEGIN LOGGING (compiles program and logs data)

[*] [1] ENTER PROGRAM TABLE 1

01:xxxx Advance to a given Instruction location ("fast forward")
01:x.xxxx Enter Execution Interval between 1/64 and 8191s.

Valid entries are multiples of	for Range of
1/64 (0.015625) s.	1/64 to 1 s.
1/8 (0.125) s.	1 to 32 s.
1 s.	32 to 8191 s.

01:Pxx Enter a Program Instruction (select appropriate instructions from the following pages). Entering an instruction number also loads blank entries for its associated parameters. For example, if Instruction 2 (differential volts) is desired, key in [2] [A] which loads:
01:P2
01:00 (Reps - repeats measurements on consecutive channels and places results in consecutive input locations)
02:00 (Range - see option codes)
03:00 (First differential channel to make measurement)
04:0000 (First input location where measured result will be stored)
05:0.0000 (Multiplier)
06:0.0000 (Offset)
Key in values for each parameter then advance to next instruction in program.

[*] [2] ENTER PROGRAM TABLE 2

Same structure as *1. Allows use of a different Execution Interval.

[*] [3] ENTER PROGRAM TABLE 3 (subroutines only)

Same structure as *1 except no Execution Interval

**1, *2, and *3 Commands*

[#] [A] Advance to next instruction
[#] [B] Back up to previous instruction
[#] [D] Delete entire instruction

[*] [4] PARAMETER ENTRY TABLE - See CR10X manual.

[*] [5] CLOCK (set or display CR10X time)

:HH:MM:SS (displays current datalogger time)
05:xxxx Year
05:xxxx Day of Year (Calendar on back)
05:HHMM Hours Minutes

[*] [6] INPUT STORAGE (display data values, flags, or port status. Compile program without resetting input storage, flags or ports)

06:xxxx Advance to a given Input Storage Location

**6 Commands*

[#] Display Input Location Number or enter location to advance to
[C] Enter value in Input Location; change sign
[D] Display flags 1-8, toggle flag w/keys 1-8
[0] Display ports 8-1, toggle port w/keys 1-8

[*] [7] FINAL STORAGE (display values stored in area 1 or 2)

07:xx Select area 1 or 2 (skipped if 2 not allocated)
07:xxxxx DSP location; enter location to advance to

**7 Commands*

[#] Display Final Storage location No.; enter location to advance to, or C to display data
[#] [A] Advance to same element in next array w/ same ID
[#] [B] Back up to same element in previous array w/ same ID

[*] [8] MANUAL DATA DUMP

08:xx Select Storage Area 1 or 2 (skipped if 2 not allocated)
01:xx Output Device/Baud Code (see Inst. 96 options)
02:xxxxx Current or start Final Storage Location
03:xxxxx DSP or end Final Storage Location
04:xx Enter any number to start dump
[#] Aborts dump

[*] [9] STORAGE MODULE COMMANDS - See Storage Module manual

[*] [A] MEMORY ALLOCATIONS (display or change)

01:xxxx Input Storage Locations
02:xxxx Intermediate Storage Locations
03:x Final Storage Locations - Area 2
04:xxxxx Final Storage Locations - Area 1
05:xxxx.x Memory allocated for program (bytes)
06:xxxx.x Remaining program memory (bytes)

[*] [B] CR10X STATUS/ON-BOARD FIRMWARE

01:xxxxx Program signature
02:xxxxx Operating System signature
03:xxxxx K bytes memory: Flash + SRAM
04:xx No. of E08's (Key 88 to reset)
05:xx No. of table overruns (Key 88 to reset)
06:x.xxxx Operating system version number
07:xxxx Revision number
08:x.xxxx Lithium battery voltage
09:xx Low 12V batt. detect counter (Key 88 to reset)
10:xx Extended mem. error counter (Key 88 to reset)
11:x.xxxx Extended memory time to erase, seconds

[*] [C] SECURITY (display or change)

01:xxxx Lock *1, *2, *3, *A, *D
02:xxxx Lock *4, *5 & *6 display only
03:xxxx Lock *5, *6, *7, *8, *9, *B; telecommunication commands except A, L, N, and E

[*] [D] STORE OR LOAD PROGRAMS

1 Print program (ASCII)
2 Load program (ASCII), *0 compile
2-- Load program (ASCII), *6 compile
6 Store program in Flash
7 Load program from Flash
7N Store/Load/Clear program in Storage Module N (N = 1-8)
1x Store program x in Storage Module N
2x Load program x from Storage Module N
3x Clear program x from Storage Module N
x = program 1-8
8 Set Datalogger ID
10 Set Power-Up Options
0 Clear ports, flags, timer, and input and intermediate storage
1 Clear intermediate storage
2 Retain ports, flags, timer and input and intermediate storage

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